Claims

We claim:

1. A transfer mechanism for producing power in speed ranges and for transmitting such power selectively, comprising:

a power input;

a first output;

a second output;

an epicyclic gearset including a first component driveably connected to the input, a second component driveably connected to the first output, and a third component;

a coupler continually driveably connected to the third component, including a selector moveable alternately between a first position where the coupler completes a drive connection that holds the third component against rotation, and a second position where the coupler mutually driveably connects the third component and one of the group consisting of the first component and second component; and

a clutch for alternately mutually connecting and releasing the first output and second output.

2. The transfer mechanism of claim 1, wherein:

the first component is a sun gear driveably connected to the input;

the second component is a carrier driveably connected to the first output;

the third component is a ring gear, driveably connected to the coupler; and

further comprising a set of planet pinions rotatably supporting on the carrier in meshing engagement with the sun gear and ring gear.

3. The transfer mechanism of claim 1, wherein a speed of the first output is less than a corresponding speed of the input when the selector is in the first position, and a speed of the first output is greater than a corresponding speed of the input when the selector is in the second position.

4. The transfer mechanism of claim 1, further comprising:

a first set of wheels adapted for a drive connection to the first output; and

a second set of wheels adapted for drive connection to the second output.

5. The transfer mechanism of claim 2, further comprising:

a transfer case fixed against rotation;

a first disc located adjacent the selector for engagement therewith, and secured to the transfer case;

a second disc located adjacent the selector for engagement therewith, and driveably connected to one of the carrier and sun gear; and

wherein the coupler comprises a hub driveably connected to the ring gear, and supporting the selector thereon for movement alternately into engagement with the first disc and second disc.

6. The transfer mechanism of claim 1, wherein the coupler is a synchronizer.

7. The transfer mechanism of claim 1, wherein the coupler is a member of a group consisting of a synchronizer and dog clutch.

8. The transfer mechanism of claim 1, wherein the second output further comprises:

a drive mechanism including a first sprocket wheel driveably connected to the clutch, a second sprocket wheel spaced from and aligned with the first sprocket wheel, and a drive belt engaged with the first sprocket wheel and second sprocket wheel.

9. The transfer mechanism of claim 1, wherein the clutch further comprises:

a first member driveably connected to the first output;

a second member driveably connected to the second output;

a first set of friction elements engaged with the first member;

a second set of friction elements engaged with the second member, elements of the first set and second set being disposed alternately and arranged for mutual

a piston moveable in the frictional engagement;

a cylinder; and cylinder in response to a pressurized state and a vented state of the cylinder, alternately driveably connecting and disconnecting the first set of friction elements and second set of friction elements, whereby the first output and second output are alternately driveably connected and disconnected.

10. A transfer mechanism for producing power in speed ranges and for transmitting such power selectively, comprising:

a transmission casing containing a transmission output;

a transfer case fixed against rotation and secured to the transmission casing;

a first output;

a second output;

a sun gear driveably connected to the transmission output;

a carrier driveably connected to the first output;

a ring gear;

a set of planet pinions rotatably supporting on the carrier in meshing engagement with the sun gear and ring gear;

a coupler driveably connected to the ring gear, including a selector moveable alternately between a first position where the coupler completes a drive connection between the transfer case and ring gear, and a second position where the coupler mutually driveably connects the ring gear and one of the group consisting of the sun gear and carrier; and

a clutch for alternately mutually connecting and disconnecting the first output and second output.

11. The transfer mechanism of claim 10, wherein a speed of the carrier is less than a corresponding speed of the transmission output when the selector is in the first position, and a speed of the carrier is greater than a corresponding speed of the transmission output when the selector is in the second position.

12. The transfer mechanism of claim 10, further comprising:

a first set of wheels adapted for a drive connection to the first output; and

a second set of wheels adapted for drive connection to the second output.

13. The transfer mechanism of claim 10, further comprising:

a first disc secured to the transfer case against rotation, located adjacent the selector for engagement with the selector; and

a second disc located adjacent the selector for engagement with the selector, and driveably connected to one of the carrier and sun gear; and

wherein the coupler comprises a hub driveably connected to the ring gear and supporting the selector thereon for movement alternately into engagement with the first disc and second disc.

14. The transfer mechanism of claim 10, wherein the coupler is a synchronizer.

15. The transfer mechanism of claim 10, wherein the coupler is a member of a group consisting of a synchronizer and dog clutch.

16. The transfer mechanism of claim 10, wherein the second output further comprises:

a drive mechanism located in the transfer case, including a first sprocket wheel driveably connected to the clutch, a second drive sprocket wheel spaced from and aligned with the first sprocket wheel, and a drive belt driveably engaged with the first sprocket wheel and second sprocket wheel.

17. The transfer mechanism of claim 10, wherein the clutch further comprises:

a first member driveably connected to the first output;

a second member driveably connected to the second output;

a first set of friction elements engaged with the first member;

a second set of friction elements engaged with the second member, elements of the first set and second set being disposed alternately and arranged for mutual frictional engagement;

a cylinder; and

a piston moveable in the cylinder in response to a pressurized state and a vented state of the cylinder, alternately driveably connecting and disconnecting the first set of friction elements and second set of friction elements, whereby the first output and first sprocket wheel are alternately driveably connected and disconnected.

18. A transfer mechanism for producing power in speed ranges and for transmitting such power selectively, comprising:

a transfer case fixed against rotation;

a transmission having an output shaft;

a first output shaft axially aligned with the transmission output shaft;

a second output shaft substantially parallel to the first output shaft;

an epicyclic gearset including a sun gear driveably connected to the transmission output shaft, a carrier driveably connected to the first output shaft, a ring gear, and a set of planet pinions rotatably supporting on the carrier in meshing engagement with the sun gear and ring gear;

a first disc secured to the transfer case against rotation;

a second disc spaced axially along the first output shaft from the first disc, and driveably connected to one of the carrier and sun gear;

a coupler coaxial with the first input shaft, located between the first disc and second disc, including a hub driveably connected to the ring gear, the hub supporting a selector for movement alternately into engagement with the first disc and second disc.

19. The transfer mechanism of claim 18, further comprising:

a drive mechanism including a first sprocket wheel journalled on the first output shaft, a second sprocket wheel secured to the second output shaft and substantially aligned axially with the first sprocket wheel, and a drive belt driveably engaged with the first sprocket wheel and second sprocket wheel; and

a clutch for alternately mutually connecting and disconnecting the first output shaft and first sprocket wheel.

20. The mechanism of claim 18, wherein a speed of the carrier and first output shaft is less than a corresponding speed of the transmission output when the selector is engaged with the first disc, and a speed of the carrier and first output shaft is greater than a corresponding speed of the transmission output when the selector is engaged with the second disc.

21. The transfer mechanism of claim 18, further comprising:

a first set of wheels adapted for a drive connection to the first output shaft; and

a second set of wheels adapted for drive connection to the second output shaft.

22. The transfer mechanism of claim 18, wherein the coupler is a synchronizer.

23. The transfer mechanism of claim 18, wherein the coupler is a member of a group consisting of a synchronizer and dog clutch.

24. The transfer mechanism of claim 19, wherein the clutch further comprises:

a first member driveably connected to the first sprocket wheel;

a second member driveably connected to the first output shaft;

a first set of friction elements engaged with the first sprocket wheel;

a second set of friction elements engaged with the second disc, elements of the first set and second set being disposed alternately and arranged for mutual frictional engagement;

a cylinder;

a piston moveable in the cylinder in response to a pressurized state and a vented state of the cylinder, alternately driveably connecting and disconnecting the first set of friction elements and second set of friction elements, whereby the first output shaft and second output shaft are alternately mutually driveably connected and disconnected.